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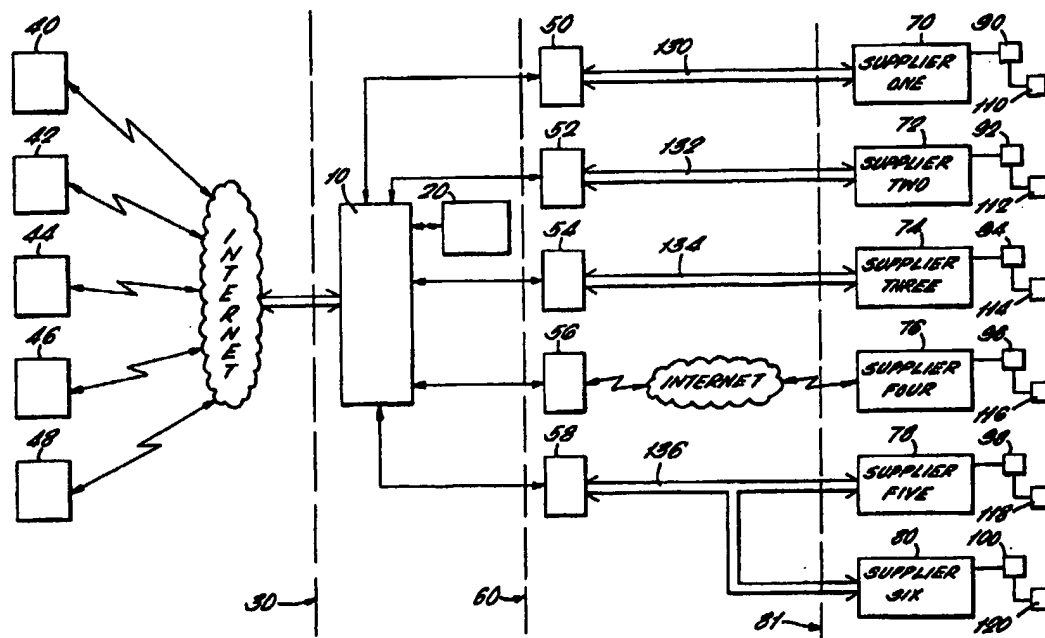
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(54) Abstract Title  
**Electronic product trading**

(57) A central server (10) facilitates trading in building/construction materials, is accessible by a plurality of clients (40-48) via the Internet, and is connected with a plurality of transaction servers (50-58). Each transaction server connects via a corresponding one or more intermediary servers (70-80), using a private line connection (130-136), to a database (110-120) which is maintained with a stock list of building and/or construction materials for a particular supplier. Each supplier database (110-120) updates a central database (20) local to the central server (10) via the private line connection (130-136) with that supplier's current stock. The central database (20) employs a 'pocketed' structure which increases data access speed.

Each client (40-48) accessing the central server (10) is provided with a menu arranged in a specific manner for ease of product searching. Results of the search are displayed according to user defined criteria such as proximity of supplier, ability to deliver and so forth.

FIG. 1



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FIG. 1

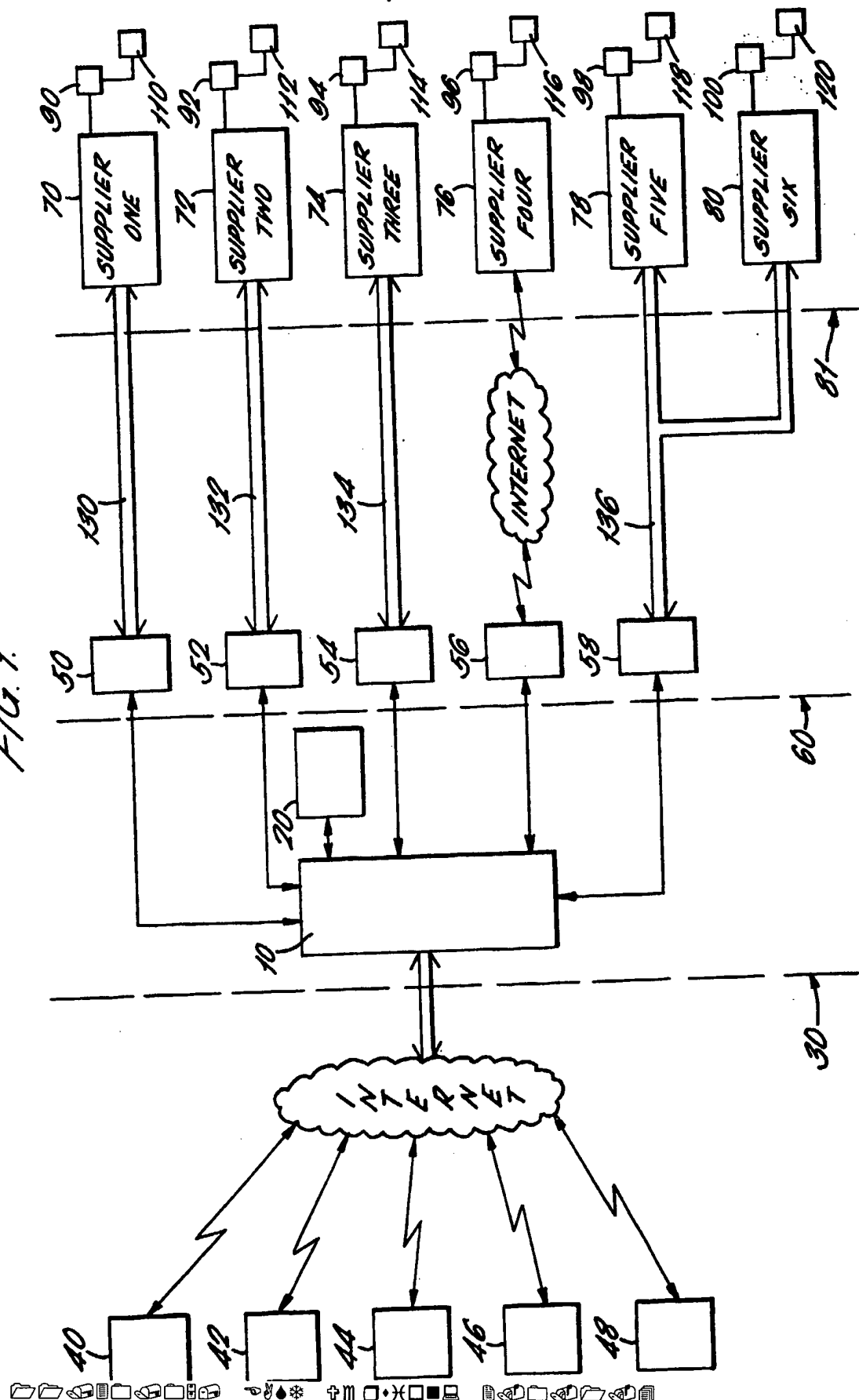


FIG. 2

<p><b>MENU 1</b></p> <ul style="list-style-type: none"> <li>CONCRETE WORK</li> <li>BRICKWORK &amp; BLOCKWORK</li> <li>TANKING &amp; WATERPROOFING</li> <li>STRUCTURAL TIMBER &amp; METALWORK</li> <li>ROOFING</li> <li>JOINERY</li> <li>RIGID SHEET MATERIAL</li> <li>FINISHINGS</li> <li>PLUMBING</li> <li>HEATING &amp; VENTILATION</li> <li>ELECTRICAL SERVICES</li> <li>EXTERNAL WORKS</li> <li>FIRE PROTECTION &amp; SAFETY</li> <li>DRAINAGE</li> <li>FOODS</li> <li>ADHESIVES &amp; SEALANTS</li> </ul>	<p><b>MENU 2</b></p> <ul style="list-style-type: none"> <li>CONCRETE WORK</li> <li>Cements &amp; Aggregates</li> <li>Concrete</li> <li>Structural Units</li> <li>Concrete Reinforcement</li> <li>Miscellaneous Items</li> <li>BRICKWORK &amp; TANKING</li> <li>WATERPROOFING</li> <li>STRUCTURAL TIMBER &amp; METALWORK</li> <li>ROOFING</li> <li>JOINERY</li> <li>RIGID SHEET MATERIAL</li> <li>FINISHINGS</li> <li>PLUMBING</li> <li>HEATING &amp; VENTILATION</li> <li>ELECTRICAL SERVICES</li> <li>EXTERNAL WORKS</li> <li>FIRE PROTECTION &amp; SAFETY</li> <li>DRAINAGE</li> <li>FOODS</li> <li>ADHESIVES &amp; SEALANTS</li> </ul>	<p><b>MENU 3</b></p> <ul style="list-style-type: none"> <li>CONCRETE WORK</li> <li>Cements &amp; Aggregates</li> <li>Portland Cements</li> <li>Rapid Hardening Portland Cement</li> <li>High Alumina Cement</li> <li>Sulphate Resisting Cement</li> <li>Sands</li> <li>Natural Aggregates</li> <li>Concrete</li> <li>Structural Units</li> <li>Concrete Reinforcement</li> <li>Miscellaneous Items</li> <li>BRICKWORK &amp; TANKING</li> <li>WATERPROOFING</li> <li>STRUCTURAL TIMBER &amp; METALWORK</li> <li>ROOFING</li> <li>JOINERY</li> <li>RIGID SHEET MATERIAL</li> <li>FINISHINGS</li> <li>PLUMBING</li> <li>HEATING &amp; VENTILATION</li> <li>ELECTRICAL SERVICES</li> <li>EXTERNAL WORKS</li> <li>FIRE PROTECTION</li> </ul>	<p><b>MENU 4</b></p> <ul style="list-style-type: none"> <li>CONCRETE WORK</li> <li>Cements &amp; Aggregates</li> <li>Portland Cements</li> <li>Ordinary Portland Cement 25 Kg</li> <li>Masonry Cement 25 Kg</li> <li>White Cement 25 Kg</li> <li>Small Bag 3Kg</li> <li>Rapid Hardening Portland Cement</li> <li>High Alumina Cement</li> <li>Sulphate Resisting Cement</li> <li>Sands</li> <li>Natural Aggregates</li> <li>Concrete</li> <li>Admixtures</li> <li>Structural Units</li> <li>Concrete Reinforcement</li> <li>Miscellaneous Items</li> <li>BRICKWORK &amp; BLOCKWORK</li> <li>TANKING &amp; WATERPROOFING</li> <li>STRUCTURAL TIMBER &amp; METALWORK</li> <li>ROOFING</li> <li>JOINERY</li> <li>RIGID SHEET MATERIAL</li> <li>FINISHINGS</li> <li>PLUMBING</li> </ul>
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FIG. 4.

<b>easyMaterial.com</b>	home	category
Item:		
<b>CONCRETE WORK</b>		
<input type="checkbox"/> Cements & Aggregates		
<input type="checkbox"/> Portland Cements		
<input type="checkbox"/> Ordinary Portland 25 kg		
<input type="checkbox"/> Masonry Cement 25 kg		
<input type="checkbox"/> White Cement 25 kg		
<input type="checkbox"/> Small Bag 3kg		
<input type="checkbox"/> Rapid Hardening Portland Cement		
<input type="checkbox"/> High Alumina Cement		
<input type="checkbox"/> Sulphate Resisting Cement		
<input type="checkbox"/> Sands		
<input type="checkbox"/> Natural Aggregates		
<input type="checkbox"/> Concrete Admixtures		
<input type="checkbox"/> Structural Units		
<input type="checkbox"/> Concrete Reinforcement		
<input type="checkbox"/> Miscellaneous Items		
<input type="checkbox"/> BRICKWORK & BLOCKWORK		
<input type="checkbox"/> TANKING & WATERPROOFING		
<input type="checkbox"/> STRUCTURAL TIMBER & METALWORK		
<input type="checkbox"/> ROOFING		
<input type="checkbox"/> JOINERY		
<input type="checkbox"/> RIGID SHEET MATERIAL		
<input type="checkbox"/> FINISHINGS		
<input type="checkbox"/> PLUMBING		
<input type="checkbox"/> HEATING & VENTILATION		
<input type="checkbox"/> ELECTRICAL SERVICES		
<input type="checkbox"/> EXTERNAL WORKS		
<input type="checkbox"/> FIRE PROTECTION & SAFETY		

<b>Supplier Two</b>	213B-69C
<b>Supplier Three</b>	7685opc
<b>Supplier One</b>	623985
<b>Supplier One</b>	623986
<b>Supplier One</b>	623987
<b>Supplier One</b>	623988
<b>Supplier Three</b>	7686opc
<b>Supplier Four</b>	c75964-11

### Contents of Tom Raw's shopping Cart:

Supplier Code	Item	Cost Each	Quantity	Sub Total
Supplier One 2318-69C	Ordinary Portland Cement	£2.21	10	£22.10
Supplier One 2234-OSR	Ecoseal BP DPC	£14.40	6	86.40
<b>Total of order:</b>				<b>£108.50</b>
<b>VAT at 17.5% (if applicable)</b>				<b>£17.99</b>
<b>Total Including VAT (if applicable)</b>				<b>£127.49</b>

Supplier Code	Item	Cost Each	Quantity	Sub Total
Supplier Three 1715301	Tilcon Class B Engineering	£215.00	5	£1075.00
<b>Total of order:</b>				<b>£1075.00</b>
<b>VAT at 17.5% (if applicable)</b>				<b>£188.13</b>
<b>Total Including VAT (if applicable)</b>				<b>£1263.13</b>

[Update](#)    [Shop](#)    [Checkout](#)



2. 2

FIG. 56.

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esyMaterial.com

item:

**CONCRETE WORK**

☐ Cements & Aggregates

☐ Portland Cement

☐ Ordinary Portland 25 kg

☐ Masonry Cement 25 kg

☐ White Cement 25 kg

☐ Small Bag 30 kg

☐ Rapid Hardening Portland Cement

☐ High Alumina Cement

☐ Sulphate Resisting Cement

☐ Sand

☐ Natural Aggregate

☐ Concrete Admixtures

☐ Structural Units

☐ Concrete Reinforcement

☐ Miscellaneous Items

☐ BRICKWORK & BLOCKWORK

☐ TANKING & WATERPROOFING

☐ STRUCTURAL TIMBER & METALWORK

☐ ROOFING

☐ JOINERY

☐ RIGID SHEET MATERIAL

☐ FINISHINGS

☐ PLUMBING

☐ HEATING & VENTILATION

☐ ELECTRICAL SERVICES

☐ EXTERNAL WORKS

☐ FIRE PROTECTION & SAFETY

Delivery Date: 13 August 2000

Payment Method: Visa Credit Card

No: 1234 5678 9123 4567 Exp: 11/2002

Supplier	Code	Item	Cost Each	Quantity	Stock	Sub Total
Supplier One	2138-69C	Ordinary Portland Cement	£2.21	10	OK	£22.10
Supplier One	2234-05R	EcoSeal BP DPC	£14.40	6	OK	£86.40
Total of order:						
VAT at 17.5% (If applicable)						
Total Including VAT (If applicable)						
£108.50						
£17.99						
£127.49						

Confirm Order with Supplier One ☒

Supplier Three

Delivery Date: 13 August 2000

Payment Method: Trade Account

Account No: T123R456A8910

Supplier	Code	Item	Cost Each	Quantity	Stock	Sub Total
Supplier Three	1715301	Tilcon Class B Engineering	£215.00	5	OK	£1075.00
Total of order:						
VAT at 17.5% (If applicable)						
Total Including VAT (If applicable)						
£188.13						
£1263.13						

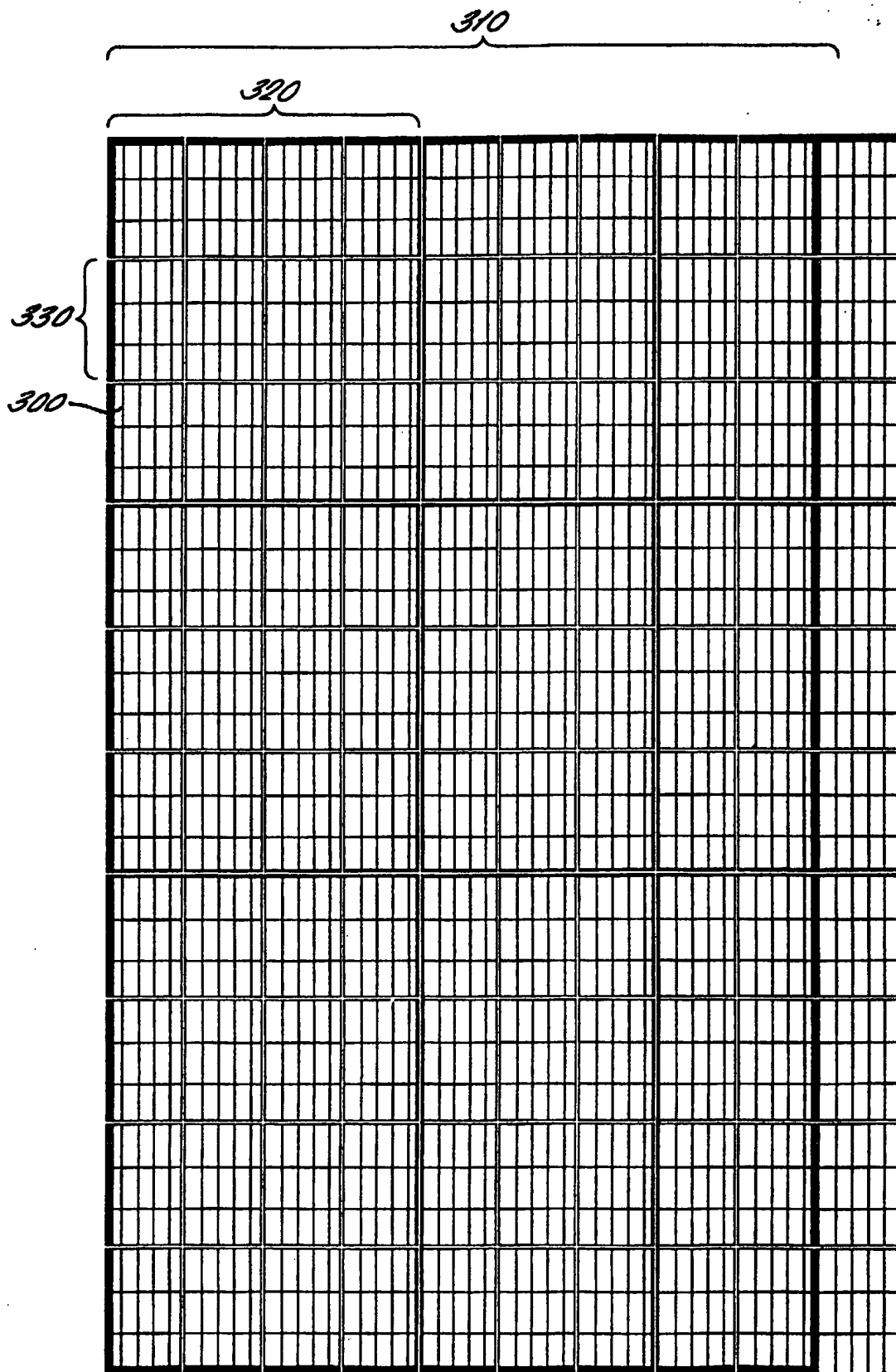
Confirm Order with Supplier Three ☒

Buy

000001

1/1

FIG. 6.





**SYSTEM AND METHOD FOR ELECTRONIC PRODUCT TRADING****Field of the Invention**

5 This invention relates to a system and a method  
for the electronic trading of products, in particular  
construction and building materials.

**Background of the Invention**

10 Large quantities of building and construction  
materials are purchased annually by the construction  
industry. At each stage in the construction of  
property, a range of different products must be  
obtained, often from a variety of different suppliers.  
It is also necessary that any supplier which is  
15 approached for a given product is capable of meeting  
maximum delivery times and can offer the product at a  
competitive price.

Traditionally, goods have been purchased by  
issuing a tender to various suppliers, and waiting for  
20 each supplier to reply to the tender before choosing  
the appropriate supplier on the basis of product  
availability or cost. There are several drawbacks with  
this. The purchaser needs to have a detailed market  
knowledge if he or she is to ensure that a tender is  
25 offered to all potentially suitable suppliers. Often  
this requires that the services of a site manager or  
architect are retained. Moreover, the time taken to  
respond to written tenders means that, at each stage  
of the building process, forward planning is essential  
30 if delays in construction are to be avoided.

With the advent of electronic mail, the time  
taken to complete the tender process has been reduced.  
Some builders merchants also offer a web site  
advertising their products. Nevertheless, the location  
35 and purchasing of building and construction materials  
at an optimum price is still a time-consuming and  
expensive exercise.



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Realistically, a single remote user would only require to connect to perhaps five supplier servers, assuming they wish to restrict their search to suppliers in the geographically local area. Using libraries allows each individual copy of the program which manages the connection between the central server and the suppliers' server to streamline itself for the user's requirements. In particular, the preferred step of accessing the data storage means from the remote location may include the steps of: accessing the central server from the remote location; identifying the specific material for which the said purchasing parameter set is to be obtained; selecting from the library of software applications, those applications which when executed will permit routing of a request from the remote user only to a selected subset of the totality of available suppliers; executing those selected software applications in response to a request, from the remote location, for information from one or more of the chosen subset of suppliers; and connecting the central server to the database that is local to the or each supplier in the chosen subset, so as to permit the said array of information to be obtained.

Most preferably, the or each of the chosen subset of suppliers may have a supplier server remote from

the central server, and the central server may be in communication with a plurality of transaction servers local thereto. In that case, the step of accessing the said storage means may further comprise: routing a request for information regarding a specific building/construction material from a remote location, via the central server, to one of the transaction servers; validating the said request at that transaction server; securely connecting between the said transaction server and the remote supplier server; and routing the request to the said remote supplier server.

In accordance with another preferred aspect of the present invention, the method may further  
15 comprise: displaying, at the remote location, a menu of a plurality of different building/construction materials; selecting from that menu, at the remote location, a specific one of the different building/construction materials; and displaying at the  
20 remote location the purchasing parameter set supplied by the plurality of suppliers and relating to the specific material selected from the menu.

Providing the information in the form of a menu, and, most preferably, a tree structure, allows customers, and especially D-I-Y customers, to locate the building/construction material of interest rapidly and intuitively. In one embodiment, the method may further comprise: selecting at the remote location and from a top level menu, a general category of building/construction materials of interest from a range of available categories; displaying a range of specific materials each belonging to the selected general category; and selecting the given specific material from the range of specific materials so as to permit the said step of comparing the equivalent purchasing parameters for that given specific material.

It may be desirable to employ a cascading tree structure to search for building/construction materials when a large number of materials are offered. Preferably, therefore, the method further comprises: selecting, at the remote location and from a top level menu, a general category of building/construction materials of general interest from a range of categories; displaying a lower level menu of sub-categories of building/construction materials relating to the selected general category in the top level menu; selecting, from the lower level menu, a sub-category of building/construction materials of interest; displaying a range of specific materials each belonging to the selected sub-category previously displayed as part of the lower level menu; and selecting the given specific material of interest from the range of specific materials so as to permit the said step of comparing the equivalent purchasing parameters for that given specific material.

Alternatively, the method may further comprise: selecting, at the remote location and from a top level menu, a general category of building/construction materials of interest from a range of available categories; displaying, consecutively and in accordance with user selection, a plurality of lower level menus of increasingly specific sub-categories of building/construction materials relating to the selected category in the top-level menu; displaying a range of specific materials each belonging to the most specific of the user selected sub-categories previously displayed in the lowest of the plurality of lower level menus; and selecting the given specific material of interest from the range of specific materials so as to permit the said step of comparing the equivalent purchasing parameters for that given specific material.

In the presently preferred embodiment, up to

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plurality of pockets within the said multidimensional database in accordance with the chosen appropriate general category; and storing an identifier for each specific building/construction material so allocated in the database, along with the or each purchasing parameter associated with that specific building/construction material.

10 In that case, in a particular database pocket, each specific building/construction material may be allocated in the database to a chosen one of a further plurality of sub-pockets containing data on sub-categories of building/construction materials, each sub-category being more specific than the general category to which it belongs.

15       The advantage of using a "pocketed" relational  
database is that it may be searched significantly more  
rapidly than a standard multi-dimensional relational  
database. This is because the time taken to search a  
database increases as the exponent of its size, and by  
20       creating a database with pockets, a plurality of  
separate databases are, in effect, generated. Thus,  
the pocketed database structure is significantly  
quicker to search.

25 In accordance with a second aspect of the present invention, there is provided a computer system for facilitating the purchase of building/construction materials, comprising: a data storage means, upon which is stored at least one purchasing parameter set including at least one purchasing parameter selected from the list comprising availability, physical  
30 proximity, delivery time, and price, for each of a plurality of suppliers of building/construction materials, and relating to one or more specific building/construction materials; and a central server in communication with the data storage means, the  
35 central server being configured to receive a request from a remote user for information from a purchasing





building/construction material selected from the menu of Figure 2;

Figure 4 shows a screen shot of the materials selected from a purchase by the user having reviewed the search results as shown in Figure 3;

Figures 5a and 5b show screen shots of a payment/delivery screen and an order confirmation screen respectively, for the purchasing of the material selected and as shown in Figure 4; and

Figure 6 shows a database structure for storing information on building/construction material.

#### Detailed Description of a Preferred Embodiment

Referring first to Figure 1, a computer system embodying an aspect of the present invention is shown. The computer system comprises a central server 10 which, in the currently preferred embodiment is a Dual Zion processor system running Red Hat Linux, Qmail, apache and Modssi with 1Gb Ram. Apache has been configured to use PHP4 which is optimised using a Zend Engine. The central server 10 is linked to a central database structure 20 which, in the preferred embodiment, includes a plurality of MYSQL databases. A plurality of files, "cookies" and other programs, as set out below, are loaded onto the central server 10. Remote access to the central server 10 is secured with a first fire wall 30.

In use, and as will be understood by those skilled in the art, one or more of a plurality of clients 40, 42, 44, 46, 48 is able to access the central server 10 via the Internet. Each of the clients 40-48 is typically a personal computer with web browsing software (such as Microsoft<sup>(R)</sup> Internet Explorer<sup>(TM)</sup> or Netscape Navigator<sup>(TM)</sup>).

The central server 10 is also connected to a plurality of transaction servers 50, 52, 54, 56, 58 through a second firewall 60. Each of the transaction

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supplier.

As will be explained in further detail below, a plurality of transaction servers 50-58 is necessary because of the virtually limitless number of permutations of server and database which different suppliers may use. Computer-based inventory databases have been available for many years, and both the hardware and software necessary to allow connection to, say, a simple system using a flat database structure will be dramatically different to the software and hardware necessary to allow connection with interrogation of a modern LAN with information stored on a Oracle<sup>(TM)</sup> database. The algorithms and techniques employed by the system of Figure 1 to optimise access to all of the various supplier databases 110-120 from the single, central server 10 will be described below.

Having described the presently preferred hardware in the system of Figure 1, the method of obtaining building/construction material information at the remote clients 40-48, from either the central database structure 20 or one of the plurality of supplier databases 110-120 will now be described.

Suppliers of building/construction materials  
25 access the central server 10, typically via a private  
line connection 130-136. For example, supplier 1 may  
connect to the central server 10 via private line  
connection 130, to access his own, dedicated, central  
database within the central database structure 20.  
30 Supplier 1 has full control over his own dedicated  
central database at the central database structure 20  
with password protection. Each of the different  
suppliers' central databases, resident in the central  
database structure 20, is completely separate from  
35 each other supplier's dedicated central database  
therein, for security purposes. Supplier 1, for  
example, might access his own central database in the



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categorisation of the product. Thus, in Menu 3, no further sub-divisions of 'High Alumina Cement' are available. Finally in Figure 2, the user selects 'Portland Cements' from Menu 3 to display the various types of Portland Cement available, namely 'Ordinary Portland 25 Kg', 'Masonry Cement 25 Kg', 'White Cement 25 Kg', or 'Small Bag 3 Kg'.

Having identified the specific product of interest by following through the menu structure to the lowest branch, the user is next invited to identify a limited number of suppliers from whom quotes for that product are desired. In one embodiment, the user may be invited to specify the suppliers by name. In a second embodiment, the user is instead requested to identify the geographical location which is of interest (for example, any suppliers within a five mile radius of the building/construction work to be carried out). By default, five suppliers are chosen, as this has been found to provide an optimum compromise between speed of supply of information to the user and a suitable range of quotes.

Once the number of suppliers has been determined, the product and price as supplied from the selected suppliers to the central database structure 20 is displayed to the user. In one embodiment, each of the various criteria supplied to the database is displayed and the user selects which he wishes to purchase on the basis of whichever criterion he chooses. For example, the user may see a list of ordinary Portland cement in supplier order, with an indication of the price per bag, delivery time, delivery cost, availability and so forth all displayed. In the preferred embodiment, however, and as shown in Figure 3, the available products are displayed in price order with the cheapest first. Here, it is seen that supplier 2 is able to offer a 25 Kg bag of



Ordinary Portland Cement at a lower price than the other suppliers. It will also be noted that the inventory code, input to the central database structure 20 by supplier 2, is displayed as well.

5       The user next adds the chosen product from the selected supplier to his shopping cart file by inserting the quantity of bags (in this case) which he wishes to purchase in the box 200 and then clicking on the 'basket' icon 210 (Figure 3). If further  
10   information on a product is required, then the user may select the 'I' icon 215. The user may add further items to his shopping cart by reverting to the menu once more and collapsing it if necessary depending upon the category of the product he is looking for.  
15   The same procedure for purchasing other materials is then repeated.

Figure 4 shows the contents of a user's shopping cart having chosen to purchase three products. It will be seen that the shopping cart is displayed in  
20   supplier order, with each material itemised together with its price. Once all items of interest have been added to the shopping cart, the 'check-out' icon towards the bottom of the screen in Figure 4 is selected, which opens a further dialogue screen on the  
25   client 40, as shown in Figure 5a. The customer enters an invoice and a delivery address, and selects the preferred delivery date.

As previously explained, one of the two files stored in the central database structure 20 for a  
30   particular user relates that user's name to trade information. Thus, the central server 10 is able to advise the customer, at the remote client, that he has trade accounts with, in the present example, supplier 1 and supplier 3, and this is shown in the centre of  
35   Figure 5a. The customer then has the option either to pay on account, or to pay by entering credit card details as shown at the bottom of Figure 5a.

Once the payment details have been entered, the page at the remote client 40 is returned to the central server 10 which processes the received information. All payment details are sent over a  
5 secure connection using 128 Bit encryption from Verisign. For security reasons, it is preferred that no payment details are stored at the central server 10 but are instead forwarded immediately to the suppliers' servers (in this case, the server 90 of  
10 supplier 1 and the server 94 of supplier 3) for them to process the information themselves. Again, this is carried out using a secure connection with encryption. Assuming that the stock is available, each relevant supplier server returns an acknowledgement to the  
15 central server 10 which forwards this to the remote client 40. A typical screen shot of the acknowledgement page forwarded to the client 40 is shown in Figure 5b. The final stage is for the customer to select the 'buy' icon, shown in Figure 5b,  
20 which causes the transaction to be completed.

Having described the principles of operation of the system, a more detailed description of the software employed to carry out the method of the invention will now be set out.

25 It will be noted, particularly from Figure 2, that, in contrast with traditional web sites, pop-up windows are not employed in the preferred embodiment. Instead, multilayer frames are provided within the web browser at the remote client. It has been found that  
30 the use of multilayer frames, generated by an applet running on the client rather than across the Internet from the central server 10, provides for significantly quicker navigation through the menus. In the preferred embodiment, there may be up to seven levels  
35 in the menu structure, with potentially several tens or even more of specific building/construction materials or categories of such materials in each

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a Java applet, as set out above, which allows rapid searching of the database at the remote client. The problem, however, is that it is only really feasible for a supplier to maintain a single list of prices for the products or materials that he offers on the central database, or he would spend inordinate amounts of time updating his database on the central database structure 20. For example, building contractors may well be offered trade discounts and, for very large contractors, these discounts may be significant. The discount may also depend upon the quantity of a particular material being purchased.

It is for these reasons that the system of Figure 1 provides access to the databases of the various suppliers. Likewise, a potential customer may receive information from the central database structure 20 and subsequently require further information from a particular supplier which is not stored on the central database structure 20.

The central server 10 is designed to connect to potentially thousands of suppliers' servers, whatever the type of server. Potentially, if every supplier server was different, then the program resident upon the central server 10 would need to include code to connect to each and every single server. Realistically, this would produce an enormous program which would take a very long time to execute. In fact, each user only usually requires to connect to perhaps five servers, for the five suppliers of interest. Thus, most of the very large program would not be required on a per user basis.

The present invention, in the preferred embodiment, solves this problem through the creation of libraries of executable code resident upon the central server 10. Each user who logs onto the central server 10 has their own, individual, PHP program running on the remote client. Thus, if ten users are

separately connected to the central server 10 via ten separate remote clients, then ten copies of that PHP program will be running. Each individual copy of the PHP program may be streamlined for the specific user's requirements. Thus, for example, if a user wishes to obtain a quote from supplier 1, supplier 3 and supplier 4, the program, when executed, loads the required software to connect to supplier servers 90, 94 and 96, and only to these servers. At the same time, another user's PHP program, running on a separate client, may only wish to connect to supplier servers for supplier 2 and supplier 4, and thus will have different requirements. PHP is favoured over, say Active Server Pages (ASP) because it is more flexible in terms of the databases to which it may connect. It is also an order of magnitude faster.

The central server 10 maintains three separate libraries for each supplier, one to obtain a quote, one to check stock, and one actually to place an order. Thus, each program is streamlined in accordance with the connection requirements to the appropriate supplier servers, with the complexity of the program increasing only with the complexity demanded by the user.

25 It is for this reason that the information  
supplied to a user at the remote client defaults to  
five suppliers for optimised searching. It has been  
discovered that, once it becomes necessary to connect  
via the central server to more than five supplier  
30 servers, the system begins to slow down. It will be  
understood that the system does not preclude access to  
more than five supplier serves at once, but that this  
does introduce noticeable delays.

35       Once the required request for connection to the  
suppliers' databases has been made by the remote  
client and the resultant page of information has been  
received at the remote client (all of this occurring

via the central server 10), the software deletes itself. When the user requests a further page, the relevant program runs (again, one per user). This time, separate libraries may be accessed as necessary.

5           The plurality of transaction servers 50-58, local to the central server 10, are provided to prevent malicious attacks in the form of malicious multiple requests to the various suppliers leading to denial of service. Without some form of precaution, it would otherwise be possible physically to prevent a supplier from taking orders, either via the central server 10 or indeed from direct contact by telephone or the like.

As the number of suppliers using the central server 10 increases, so will the number of transaction servers. Each transaction server receives a request from a remote client, checks its validity and carries out other security procedures. The request is then forwarded to the relevant intermediary server 70-80 at the premises of the supplier of interest. Each intermediary server also performs several checks before forwarding the request to the supplier server 90-100. Each intermediary server prepares the request for the corresponding supplier server, by, for example, removing any extraneous data which the request may have accumulated following transmission from the remote client. Importantly, the servers prevent any system other than the central server 10 from reaching the supplier server, and this is assisted by the use of private line connections 130-136.

The central server 10 is programmed to monitor traffic between the intermediary and transaction servers, so that, if necessary, requests to a particular supplier's server may be blocked if that server is experiencing difficulty with current demand levels. In such a situation, that particular supplier

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database is arranged as a "pocketed" structure, as shown. This allows searching to be accomplished substantially more quickly than a standard, multi-dimensional relational database.

5           In particular, the database is arranged such that the most general categories of materials are placed in separate pockets. In the example of Figure 2, Menu 1, there are sixteen general categories in the top level menu, and the database would thus be divided into  
10 sixteen separate pockets 310. Each pocket 310 may in turn be sub-divided into sub-pockets 320 into which sub-categories (such as are displayed in Menu 2, Figure 2) are stored. Yet smaller sub-pockets 330 may be employed for the level of category below that, and  
15 so forth.

It will be seen from Figure 6 that the various pocket sizes do not need to be the same.

The advantage of this structure for the present application is that it dramatically increases the  
20 speed at which the database may be searched. In essence, by using sixteen pockets, sixteen separate databases are formed instead of one extremely large database. The particular material of interest is located in one of the pockets and it is simply  
25 necessary to index that material to the relevant pocket and sub-pocket if necessary. Referring again to the example in Figure 2, a 25 Kg bag of ordinary Portland cement may be indexed in the database as [1,1,1,ABCD] where the numerals indicate the pocket  
30 relating to concrete work, the sub-pocket relating to cements and aggregates, the sub-sub-pocket relating to Portland cements and the characters A B C D index the relevant information within the smallest pocket.

In order to store information in the correct  
35 pocket of the database, it is necessary initially that the product from a given supplier is categorized manually. In other words, when a supplier decides to

provide information accessible from the central database structure 20, he must enter information regarding each product into the correct category himself, and the database structure then stores the product in the appropriate pocket. Preferably, a category structure exists, so that the supplier is prompted by the central server with a menu similar to that shown in Figure 2 to help him categorize his products correctly.

This process only needs to be carried out whilst the supplier is initially setting up his database on the central database structure 20, and if he subsequently wishes to add new products to the list of those products he offers. Products about which information has been stored already are given a product ID that is unique at least for their supplier. The product ID allows the category structure to be maintained even when there is no data stored in it, and to allow prices to be updated easily.

Although one specific, preferred embodiment of the invention has been described, it will be understood that various modifications and additions to the system may be contemplated without departing from the scope of invention, which is defined in the attached claims.

For example, rather than searching via the menu structure, the data forwarded to the web browser of the remote client may be searched using a keyword search rather than drilling down through menus. Means for permitting data entry to carry out a keyword search are shown towards the top of Figure 3.

Furthermore, in addition to manual updating of the central database structure 20 by the various suppliers, the system may be configured automatically to connect to suppliers' servers, using the preferred structure of transaction and intermediary servers, to permit that particularly supplier's information stored

in the central database to be updated without manual  
input being necessary. Typically, the server would  
make this connection overnight whilst the supplier  
himself is unlikely to be placing much load on the  
5 supplier server.

**CLAIMS:**

1. A method of facilitating the purchase of building/construction materials, comprising the steps of:

storing on data storage means, for each of a plurality of suppliers of building/construction materials, at least one purchasing parameter set including at least one purchasing parameter selected from the list comprising availability, physical proximity, delivery time, and price, and relating to one or more specific building/construction materials; accessing, from a remote location, the said data storage means, via a central server in communication with the said data storage means;

obtaining, at the remote location, an array of information including the or each purchasing parameter set supplied by the plurality of suppliers and relating to at least one of the specific materials;

20 and

comparing, at the remote location, equivalent purchasing parameters, provided by different suppliers for a given specific material, and obtained from the data storage means via the central server, so as to allow purchase of that given specific material from the supplier or those suppliers for which one or more purchasing parameters in a purchasing parameter set are considered most favourable.

30           2. The method of claim 1, in which the data storage means includes a database local to the central server.

3. The method of claim 1 or claim 2, in which  
35 the data storage means comprises a plurality of  
separate databases, each of which is local to a  
corresponding one of the plurality of suppliers, the

method further comprising the step of routing access to the plurality of separate databases via the central server.

5           4.    The method of claim 2 or claim 3, further comprising:

              displaying, at the remote location, a menu of a plurality of different building/construction materials;

10           selecting from that menu, at the remote location, a specific one of the different building/construction materials; and

              displaying at the remote location the purchasing parameter set supplied by the plurality of suppliers  
15           and relating to the specific material selected from the menu.

              5.    The method of claim 4, in which the menu is presented as a hierarchical structure, the method  
20           further comprising:

              selecting at the remote location and from a top level menu, a general category of building/construction materials of interest from a range of available categories;

25           displaying a range of specific materials each belonging to the selected general category; and

              selecting the given specific material from the range of specific materials so as to permit the said step of comparing the equivalent purchasing parameters  
30           for that given specific material.

              6.    The method of claim 4, in which the menu is presented as a hierarchical structure, the method further comprising:

35           selecting, at the remote location and from a top level menu, a general category of building/construction materials of general interest from a range of

categories;

displaying a lower level menu of sub-categories of building/construction materials relating to the selected general category in the top level menu;

5 selecting, from the lower level menu, a sub-category of building/construction materials of interest;

10 displaying a range of specific materials each belonging to the selected sub-category previously displayed as part of the lower level menu; and

selecting the given specific material of interest from the range of specific materials so as to permit the said step of comparing the equivalent purchasing parameters for that given specific material.

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7. The method of claim 4, in which the menu is presented as a hierarchical structure, the method further comprising:

20 selecting, at the remote location and from a top level menu, a general category of building/construction materials of interest from a range of available categories;

25 displaying, consecutively and in accordance with user selection, a plurality of lower level menus of increasingly specific sub-categories of building/construction materials relating to the selected category in the top-level menu;

30 displaying a range of specific materials each belonging to the most specific of the user selected sub-categories previously displayed in the lowest of the plurality of lower level menus; and

35 selecting the given specific material of interest from the range of specific materials so as to permit the said step of comparing the equivalent purchasing parameters for that given specific material.

8. The method of any one of claims 4 to 7, in



allocating each specific building/construction material to one of the plurality of pockets within the said multidimensional database in accordance with the chosen appropriate general category; and

storing an identifier for each specific building/construction material so allocated in the database, along with the or each purchasing parameter associated with that specific building/construction material.

13. The method of claim 12, in which, in a particular database pocket, each specific building/construction material is allocated in the database to a chosen one of a further plurality of sub-pockets containing data on sub-categories of building/construction materials, each sub-category being more specific than the general category to which it belongs.

14. The method of any of claims 5, 6, 7, 12 or 13, in which the general categories are selected in accordance with the architectural design and build process for a property.

15. The method of any preceding claim, further comprising storing information relating to each of a plurality of suppliers of building/construction materials.

16. The method of claim 15, in which the information relating to each supplier is stored in a separate database that is local to the central server and is remotely accessible by the corresponding supplier.



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provided by different suppliers for a given specific material may be compared at the remote location so as to permit purchase of that given specific material from the supplier for which one or more purchasing parameters in a purchasing parameter set are  
5 considered most favourable.

22. The system of claim 21, further comprising at least one remote terminal configured to receive one  
10 or more files from the server in response to a request made by the or each remote terminal for information.

23. The system of claim 21 or claim 22, in which the data storage means is a relational database  
15 divided into a plurality of pockets, the or each purchasing parameter set for a supplier being stored in a particular one of the pockets in the database in accordance with a category of building/construction materials to which the associated particular  
20 building/construction material belongs.

24. The system of claim 23, in which the data storage means is local to the central server.

25. The system of claim 21 or claim 22, further comprising a plurality of transaction servers, arranged locally to the central server, and a plurality of supplier servers each local to the data storage means which comprises a database of  
30 building/construction materials for a corresponding supplier of such materials, each transaction server being configured to forward from the central server and, on request from the remote user, a request for information to one or more of the supplier servers, so  
35 as to cause the said array of information to be forwarded, in response, to the remote user.

26. The system of claim 25, in which the server  
has access to a library of software routines each of  
which is operable, when executed, to cause connection  
of the central server, via at least one of the  
5 transaction servers, to a respective one of the  
supplier servers to in turn allow access.

27. A computer program product comprising  
program elements which, when executed upon the central  
10 server, cause the method of any of claims 1 to 20 to  
be carried out.

28. A server loaded with the computer program  
product of claim 27.  
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29. A method of facilitating the purchase of  
building/construction materials substantially as  
herein described with reference to the accompanying  
drawings.  
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30. A computer system substantially as herein  
described with reference to and as shown in the  
accompanying drawings.



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Application No: GB 0023711.5  
 Claims searched: 1 to 30

Examiner: John Donaldson  
 Date of search: 13 June 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): G4A(AUXF)

Int Cl (Ed.7): G06F 17/00, 17/60

Other: Online: WPI, EPODOC, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X, E	WO 01/55928 A1 (FAIRFAX EXPRESS), see abstract, page 8, line 25 to page 9, line 31, page 11, line 15 to page 12, line 27, page 13, line 24 to page 14, line 25, page 15, line 32 to page 16, line 12	1 to 28

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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